

# RJK0380DPA

30V, 45A, 3.2mΩ max.

Built in SBD N Channel Power MOS FET

High Speed Power Switching

R07DS0938EJ0400

Rev.4.00

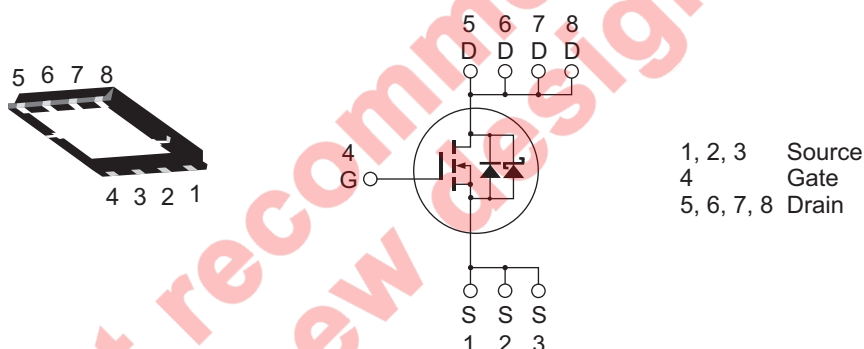
Mar 21, 2013

## Features

- High speed switching
- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance
- Pb-free
- Halogen-free

## Outline

RENESAS Package code: PWSN0008DE-A  
(Package name: WPAK(3F))



## Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{DSS}$	30	V
Gate to source voltage	$V_{GSS}$	±20	V
Drain current	$I_D$	45	A
Drain peak current	$I_{D(pulse)}$ <sup>Note 1</sup>	180	A
Body-drain diode reverse drain current	$I_{DR}$	45	A
Avalanche current	$I_{AP}$ <sup>Note 2</sup>	25	A
Avalanche energy	$E_{AR}$ <sup>Note 2</sup>	62.5	mJ
Channel dissipation	$P_{ch}$ <sup>Note 3</sup>	50	W
Channel to Case Thermal Resistance	$\theta_{ch-C}$	2.5	°C/W
Channel temperature	$T_{ch}$	150	°C
Storage temperature	$T_{stg}$	-55 to +150	°C

Notes: 1.  $PW \leq 10 \mu s$ , duty cycle  $\leq 1\%$

2. Value at  $T_{ch} = 25^\circ C$ ,  $R_g \geq 50 \Omega$

3.  $T_c = 25^\circ C$

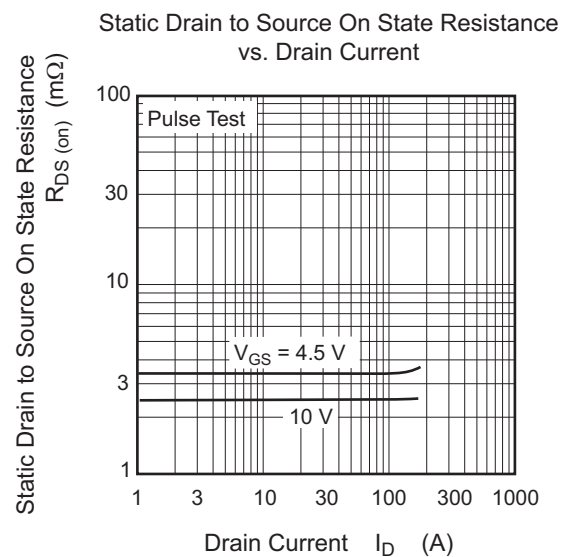
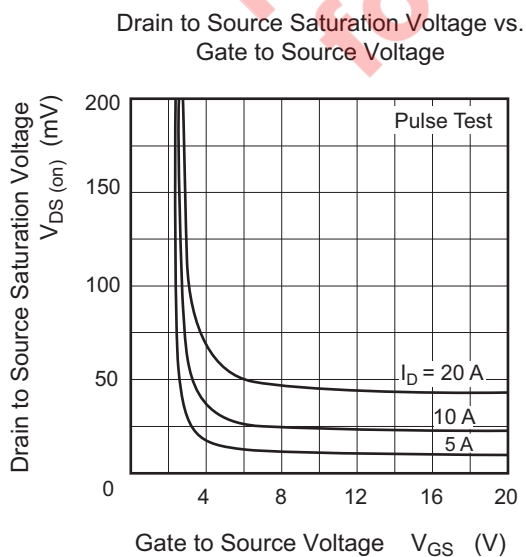
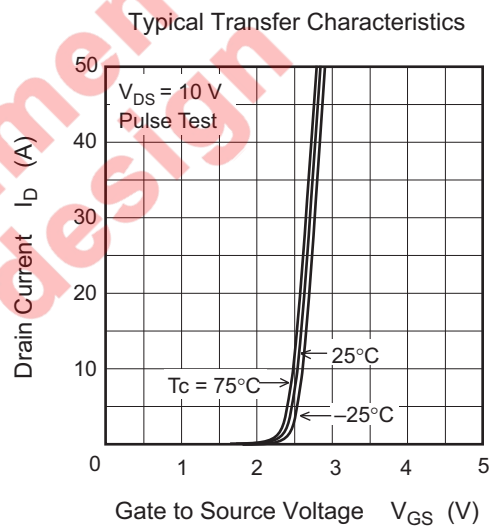
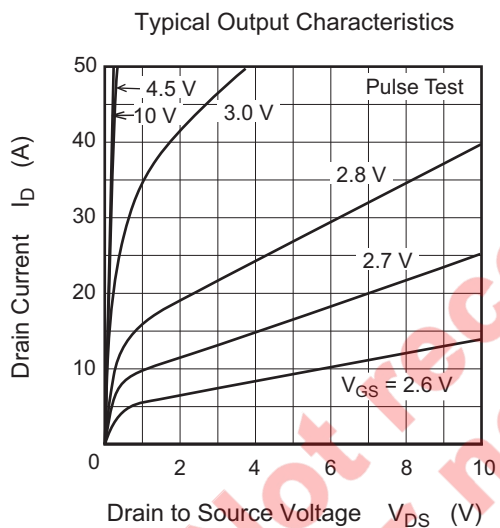
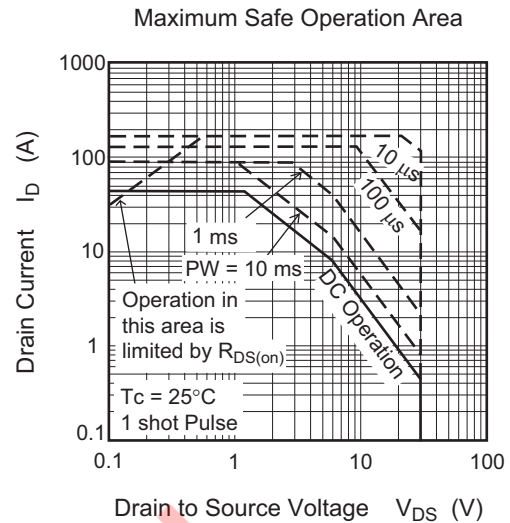
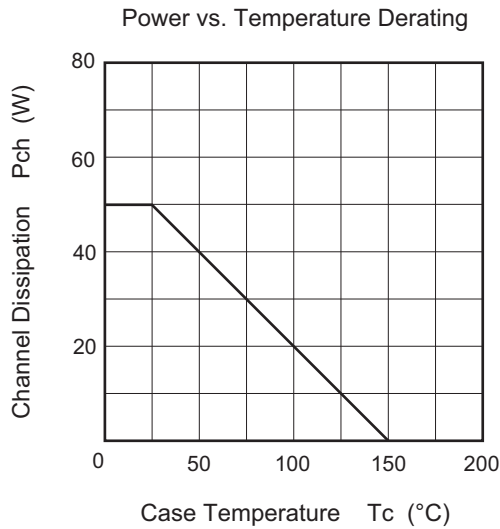
## Electrical Characteristics

(Ta = 25°C)

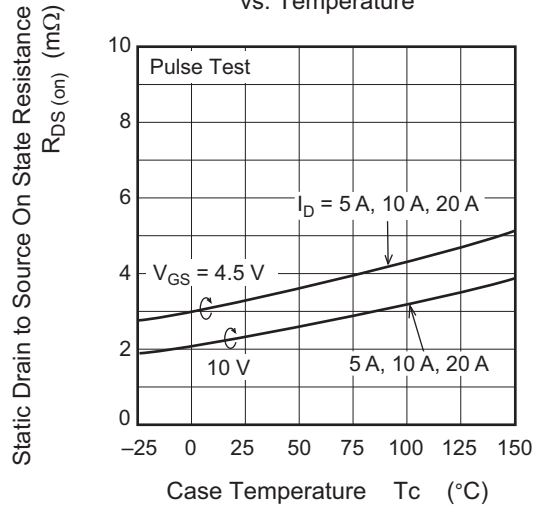
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	30	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 0.1$	$\mu\text{A}$	$V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	m A	$V_{DS} = 30 \text{ V}$ , $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.2	—	2.5	V	$V_{DS} = 10 \text{ V}$ , $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	2.4	3.2	m $\Omega$	$I_D = 22.5 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Note4</sup>
	$R_{DS(on)}$	—	3.3	4.7	m $\Omega$	$I_D = 22.5 \text{ A}$ , $V_{GS} = 4.5 \text{ V}$ <sup>Note4</sup>
Forward transfer admittance	$ y_{fs} $	—	95	—	S	$I_D = 22.5 \text{ A}$ , $V_{DS} = 10 \text{ V}$ <sup>Note4</sup>
Input capacitance	$C_{iss}$	—	3350	—	pF	$V_{DS} = 10 \text{ V}$ , $V_{GS} = 0$ , $f = 1 \text{ MHz}$
Output capacitance	$C_{oss}$	—	730	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	330	—	pF	
Gate Resistance	$R_g$	—	1.6	—	$\Omega$	
Total gate charge	$Q_g$	—	24	—	nC	$V_{DD} = 10 \text{ V}$ , $V_{GS} = 4.5 \text{ V}$ , $I_D = 45 \text{ A}$
Gate to source charge	$Q_{gs}$	—	9.2	—	nC	
Gate to drain charge	$Q_{gd}$	—	6.7	—	nC	
Turn-on delay time	$t_{d(on)}$	—	14	—	ns	$V_{GS} = 10 \text{ V}$ , $I_D = 22.5 \text{ A}$ , $V_{DD} \cong 10 \text{ V}$ , $R_L = 0.44 \Omega$ , $R_g = 4.7 \Omega$
Rise time	$t_r$	—	16	—	ns	
Turn-off delay time	$t_{d(off)}$	—	58	—	ns	
Fall time	$t_f$	—	11.5	—	ns	
Body-drain diode forward voltage	$V_{DF}$	—	0.39	—	V	$I_F = 2 \text{ A}$ , $V_{GS} = 0$ <sup>Note4</sup>
Body-drain diode reverse recovery time	$t_{rr}$	—	30	—	ns	$I_F = 45 \text{ A}$ , $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

Notes: 4. Pulse test

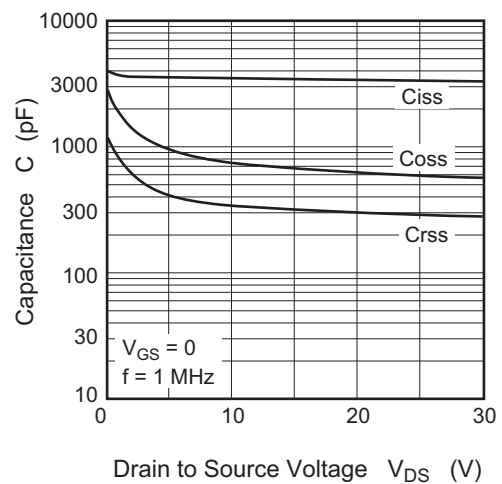
## Main Characteristics



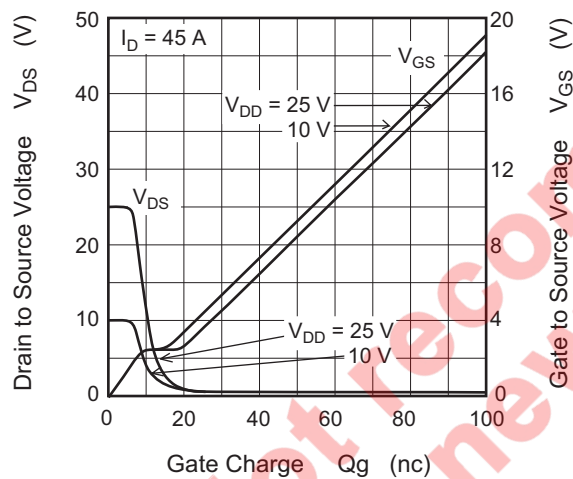
Static Drain to Source On State Resistance vs. Temperature



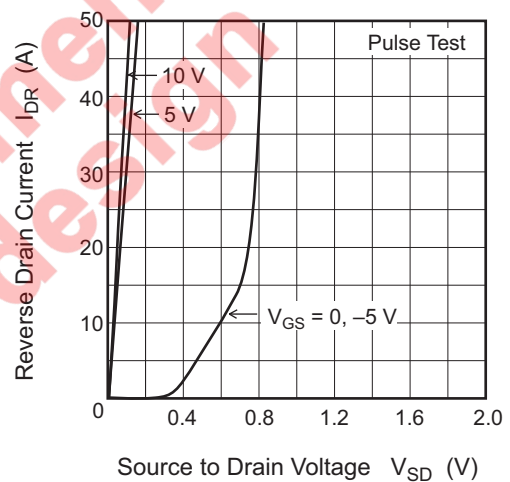
Typical Capacitance vs. Drain to Source Voltage



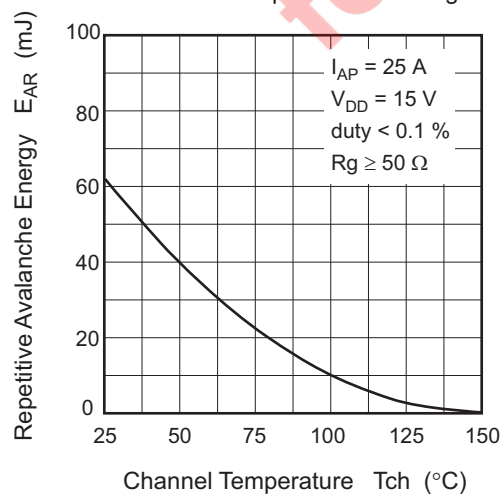
Dynamic Input Characteristics

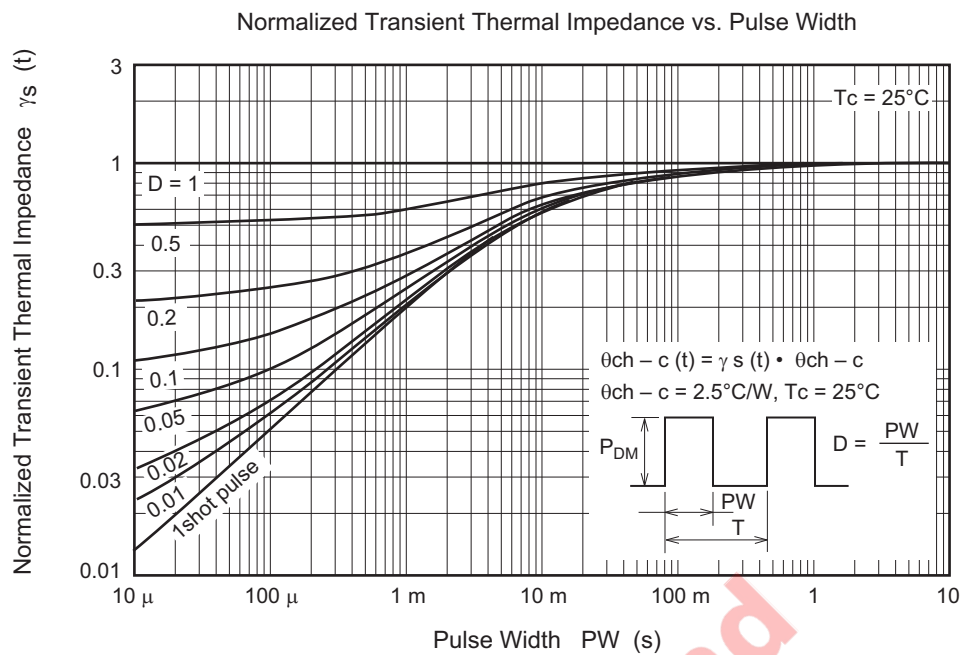


Reverse Drain Current vs. Source to Drain Voltage

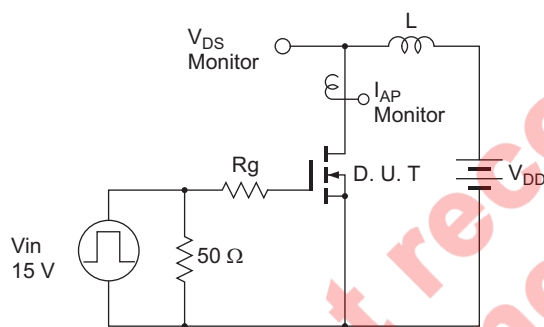


Maximum Avalanche Energy vs. Channel Temperature Derating

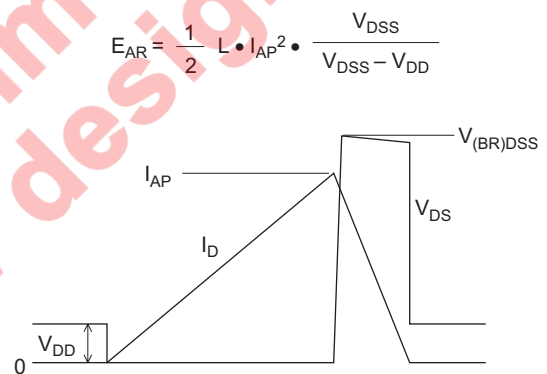




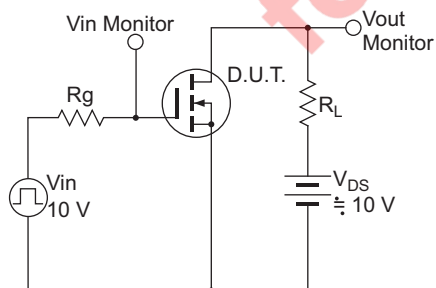
Avalanche Test Circuit



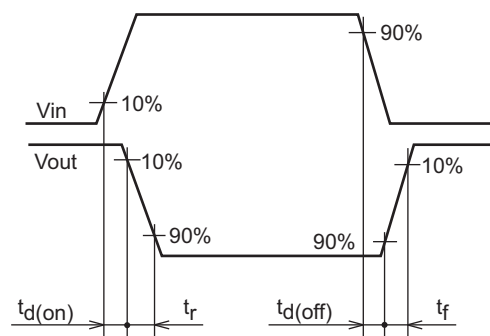
Avalanche Waveform



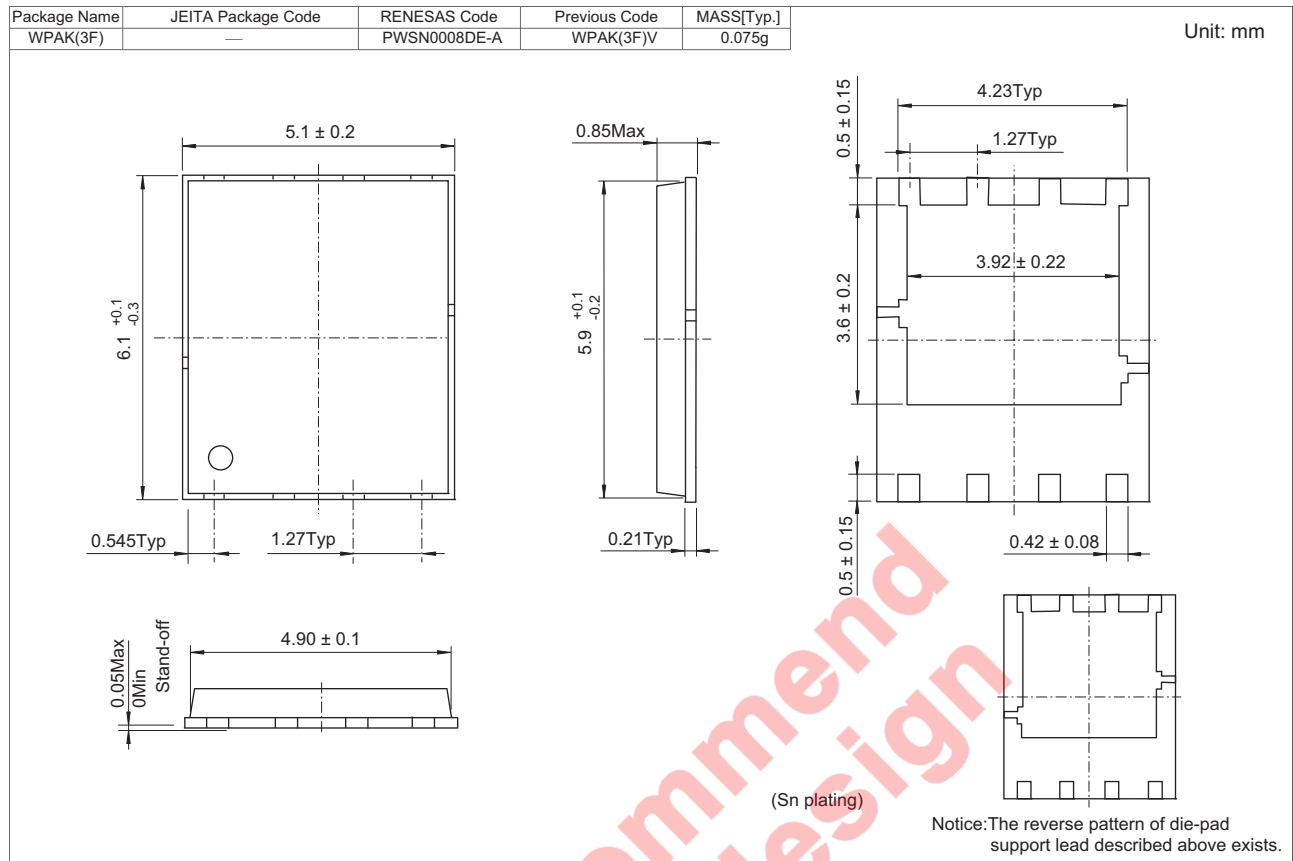
Switching Time Test Circuit



Switching Time Waveform



## Package Dimensions



## Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJK0380DPA-00-J5A	3000 pcs	Taping

Note: The symbol of 2nd "-" is occasionally presented as "#".

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2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.  
Tel: +1-408-588-6000, Fax: +1-408-588-6130

#### **Renesas Electronics Canada Limited**

1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada  
Tel: +1-905-898-5441, Fax: +1-905-898-3220

#### **Renesas Electronics Europe Limited**

Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.  
Tel: +44-1628-651-700, Fax: +44-1628-651-804

#### **Renesas Electronics Europe GmbH**

Arcadiastrasse 10, 40472 Düsseldorf, Germany  
Tel: +49-211-65030, Fax: +49-211-6503-1327

#### **Renesas Electronics (China) Co., Ltd.**

7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China  
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

#### **Renesas Electronics (Shanghai) Co., Ltd.**

Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China  
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

#### **Renesas Electronics Hong Kong Limited**

Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong  
Tel: +852-2886-9318, Fax: +852 2886-9022/9044

#### **Renesas Electronics Taiwan Co., Ltd.**

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Tel: +65-6213-0200, Fax: +65-6213-0300

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Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

#### **Renesas Electronics Korea Co., Ltd.**

11F., Samik Laved' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea  
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